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ABSTRACT

Three studies were conducted to develop and evaluate a diagnostically based curriculum for disadvantaged preschool children. The population consisted of 139 white and 4 Negro Appalachian 5-year-olds from the lowest socioeconomic class, who scored from 50 to 85 on the 1960 Stanford-Binet L-M Intelligence Scale. One of the 3 groups organized received diagnostic treatment; the second group received traditional kindergarten treatment; the third group received no treatment. A battery of 17 tests and teacher and project-staff evaluations were used for screening, pretest or posttest measurement, diagnosis, or follow-up. The results indicated that the diagnostic curriculum was superior in the areas of intelligence, language, and personal-social adjustment and was equal to the traditional kindergarten approach for motor development. A test schedule, a list of instruments used, and the statistical data are also presented. [Not available in hard copy due to marginal legibility of original document.] (BD)

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DIAGNOSTICALLY BASED CURRICULUM
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DIAGNOSTICALLY BASED CURRICULUM
BLOOMINGTON, INDIANA

One of a Series of

Successful Compensatory Education Programs

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FOREWORD

This project report is part of an independent study of selected exemplary programs for the education of disadvantaged children completed by the American Institutes for Research in the Behavioral Sciences, Palo Alto, Calif., under contract with the U.S. Office of Education.

The researchers report this project significantly improved the educational attainment of the disadvantaged children involved. Other communities, in reviewing the educational needs of the disadvantaged youngsters they serve, may wish to use this project as a model - adapting it to their specific requirements and resources.

Division of Compensatory Education
Bureau of Elementary and Secondary Education

THE DIAGNOSTICALLY BASED CURRICULUM

IN BLOOMINGTON, INDIANA

Introduction

The purpose of this study was to develop and evaluate a diagnostically based curriculum for disadvantaged preschool children. The diagnosis attempted to identify the child's learning deficits in language, concept, and fine motor development so that specific remediation procedures could be applied individually. With the exception of specifically developed diagnostic language and fine motor lessons, the experimental curriculum included many of the kinds of activities found in regular preschool and kindergarten programs. However, activities such as music, art, free play, and story-telling were not used as ends in themselves, but as vehicles for the development and remediation of specific cognitive, psycho-motor, and social behaviors.

The student population consisted of 139 Appalachian white and four Negro children from families of the lowest socio-economic class as determined by the Warner-Meeker-Els Index of Status Characteristics. From those children who met the socio-economic criteria, only 5-year old children who scored between 50-85 on the 1960 Stanford-Binet L-M Intelligence Scale were selected.

Three studies with similar design were completed in 3 consecutive years (1964-67) preceded by a 1-semester pilot study. A longitudinal study of the children as they proceeded through various public schools was also conducted. In each of the three studies approximately 15 children were placed in either an Experimental Preschool (EPS), Kindergarten Contrast (KC), or At Home Contrast (AHC) group. The EPS children received the diagnostic treatment; the KC children received a traditional kindergarten treatment; the AHC received no treatment. Although the original intent was to replicate the basic study twice to accumulate larger numbers of subjects within each treatment, the three studies were not precise replications. The diagnostically developed curriculum was modified each successive year by incorporating experiences gained from the previous years.

The diagnoses were made on the basis of Stanford-Binet scores and direct observations of teachers and project staff. Measurement of gains in language development, IQ, and motor development were made with five standardized tests. Results for intelligence and language development favored the EPS group. Results in Fine and Total Motor skill

equally favored the EPS and KC groups over continued residence in the home.

Personnel

The task of developing and implementing the curriculum for the EPS groups was the responsibility of a continuously functioning curriculum committee which included the following project staff.

A. Principal Investigators. (Three in number, each devoting one-third time for 3 years to the project; Ph.D.'s; one was specialized in the clinical aspects of the psychology of child development, the second was a school psychologist, and the third was an expert in special education.)

These three people were responsible for planning the curriculum and designing the project and its evaluation. The third collaborated with the reading specialist to prepare the diagnostically based curriculum.

B. Project Coordinator. (Full-time; doctoral student in clinical and school psychology minoring in special education.)

He scheduled the testing of all experimental and control pupils; assigned the graduate students to the tasks of collecting curriculum materials, test data and observation data; and generally supervised the total operation of the program.

C. Reading Specialist. (Part-time, associate professor of education; M.A.)

The reading specialist assisted in the preparation of the diagnostically based curriculum.

D. Teachers (EPS). (One each year; full-time; well trained in special education, but little or no experience; received inservice training.)

The teacher assisted in the development of classroom procedures and lesson plans; she also evaluated progress in all areas.

E. Teacher Aides. (Full-time; people with degrees, but not usually in the field of education; males.)

These assistants were employed only in the second- and third-year studies. They were introduced chiefly to alleviate the disruptive atmosphere which was formerly brought on by the novelty of male figures when they were used for testings.

F. Graduate Assistants. (Part-time; advanced graduate students in educational psychology, school psychology, and special education training programs; trained in testing, observation, and interviewing techniques.)

The graduate assistants administered the pre- and posttests.

Available to the curriculum committee on a consultant basis were the following additional staff: project social worker, speech therapists, optometrists, physicians, and curriculum specialists in art, music, and physical education.

The committee's working schedule included weekly meetings, individually arranged weekly observations of the EPS class, less frequent observations of the KC class, and special training sessions with the experimental (EPS) teacher.

Methodology: General

The program was conducted in small communities (population 10,000-40,000) in Southern Indiana, where the population meeting the criteria for inclusion in the project consisted primarily of Appalachian white 5-year olds. Intervention was confined to the school day (9:00 a.m. to 1:00 p.m.), and contact with parents was limited to that necessary to locate the children, enlist them in the study, and maintain attendance. No effort was made to modify the schools to which the children went for first grade following their project year.

Three studies with similar design were completed in 3 consecutive years. Approximately 45 children were involved each year and were assigned in groups of 15 to one of the following three study sections:

EPS - Experimental Preschool
KC - Kindergarten Contrast
AHC - At Home Contrast Group

[These abbreviations will be used throughout the text to identify the groups; a subscript number will appear with these initials to distinguish one year's study from another (i.e., EPS_1, EPS_2).]

The experimental groups (EPS) received a structural curriculum designed to remedy specific diagnosed deficits of the individual child in areas of language development, fine motor coordination, concept formation, and socialization. The kindergarten groups (KC) received a traditional kindergarten program. The At Home Contrast Groups (AHC) received only the pre- and posttesting.

The EPS program was designed to effect greater gains in the cognitive and affective areas cited in the preceding paragraph than a more traditional kindergarten approach or no kindergarten experience at all. It was hypothesized that these gains would then be maintained during the elementary grades.

Based on the assumption that intelligence can be modified by experience, the project staff set forth the following objective for the EPS program (Hodges, McCandless, Spicker, 1967):

1. Identify and where necessary develop or adapt techniques and instruments useful in preschool diagnosis and that lead to productive curriculum practices.

2. Obtain data concerning the effective use of selected diagnostic tools in curriculum development for children with specified strengths and weaknesses in certain cognitive and affective areas related to school achievement and adjustment.

3. Develop and refine curriculum strategies for 5-year old psycho-socially deprived children for purposes of preventing future mental and educational retardation.

4. Evaluate the effectiveness of the diagnostically based curriculum strategies in terms of the purposes stated in objective 3 above.

A. Assessment and Diagnostic Techniques

Tables 1 and 2 list all measures used in this project, including medical, cognitive, and affective assessments. Some techniques were used for screening pupils, some for pre- and posttest measurements of change over the period of intervention, some for diagnostic curriculum purposes, some for follow-up information, and others for a combination of these purposes. Table 2 delineates the instruments used, their purposes, and the groups to which they were applied.

No children were included in the project for whom there were disabilities other than poor prognosis for school achievement associated with psycho-social deprivation. However, for those screened and identified as having medical and physical anomalies, corrections were made when necessary and possible.

B. Examiner Selection and Training

Pre- and posttesting stressed objectivity of approach to all children, development of adequate rapport, and maintenance of constant testing conditions.

The graduate students who served as examiners were considered competent in administering individual and group tests, and were trained in behavioral observation and interviewing techniques. Specialists such as speech therapists, optometrists, and psychiatrists were drawn into the project as needed.

Follow-up criterion measures were obtained by teachers and examiners who did not know which children were in experimental or control groups and who also were naive with regard to the hypothesized outcome of the study.

C. Program Scheduling

The curriculum committee worked closely with the class teacher in planning an effective distribution of activities in the program. These class programs were flexible, but the basic principles of using times of the day when the children were most alert for the most formalized instruction and of providing a balance between quiet activities and action situations were always observed. Also, even though

Table 1

INSTRUMENTS OF ASSESSMENT
DIAGNOSTICALLY BASED CURRICULUM PROJECT

Medical-Physical	Pre- and Posttest Measures of Cognition	Achievement Measures	Affective Measures
Optometric	[a]Stanford-Binet, Form L-M	Eight-Point Reading Scale	Teacher Paired Comparison on:
Psychiatric	Peabody Picture Vocabulary Test	Teacher Paired Comparison on:	a. Personal-social Adjustment
Neurological	Raven's Progressive Matrices	a. Number Skills b. Reading Skills	Sociometric
Pediatric	Goodenough Draw-a-Man	California Achievement Test	Task Involvement Scale
	[a]Illinois Test of Psycho-linguistic Abilities	School Report Card	
	Lincoln-Oseretsky Motor Development Scale		
	San Francisco Inventory of Communicative Effectiveness		
	Caldwell Preschool Inventory		
	[a]Frostig Test of Visual Perception		
	Optometric Evaluation		
	Articulation		
	[a]Columbia Mental Maturity Scale		
	<u>Demographic Data</u>		
	1. Warner-Meeker-Eell's <u>Index of Status Characteristics</u>		
	2. Wolf Interview Form		

[a] These instruments were used to formulate diagnostic curriculum plans as well as to provide measures of change.

[Source: Table 2, p. 21, Hodges, McCandless, Spicker (1967)]

Table 2

TEST SCHEDULE FOR STUDIES I, II, AND III
DIAGNOSTICALLY BASED CURRICULUM PROJECT

Instrument	Time and Study					
	Fall 1964	Spring 1965	Fall 1965	Spring 1966	Fall 1966	Spring 1967
1. Revised Stanford-Binet, L-M	I[a]	I	II[b]	I, II	III[c]	I, II, III
2. Peabody Picture Vocabulary Test	I	I	II	I, II	III	I, II, III
3. Illinois Test of Psycho-linguistic Abilities	I	I		I	III	I, II, III
4. Columbia Mental Maturity	I	I	II	II	III	I, II, III
5. Frostig Developmental Tests of Visual Perception	I	I				
6. Raven's Progressive Matrices (Colored)	I	I				
7. Goodenough Draw-a-Man	I	I				
8. Caldwell Preschool Inventory			II	II	III	III
9. Reverse PPVT			II	II	III	III
10. Picture Language Sample			II	II		
11. San Francisco Inventory of Communication Effectiveness					III	III
12. Task Involvement Scale			II	II	III	III
13. Report Cards				I		I, II
14. Teacher Paired-Comparison-Personal-Social				I		I, II
15. Teacher Paired Comparison-Number Concepts				I		II
16. Teacher Paired Comparison-Reading				I		II
17. Eight-Point Reading Scale				I		II

[a] I=Study I (1964-65) [b] II=Study II (1965-66) [c] III=Study III (1966-67)

[Source: Table 3, p. 22, Hodges, McCandless, Spicker (1967)]

a period was designated as snack time, lunch time, free play, or recess time and so perceived by the children, these periods were thoughtfully used by the teacher (and, after the first year, by teacher aides) as valuable opportunities for ancillary activities relating to the main objective for the day's specific lessons.

A representative sample of a daily class schedule follows: Class Daily Schedule - sample taken from the third-year experimental group.

9:00-9:30 Formal Language Lesson
9:30-9:45 Directed Activity (practice following language lesson - self-help activity, working with puzzles, coloring work)
9:45-10:00 Snack Time (placed early in the morning because many of the children came without breakfast)
10:00-10:20 Story of the Week
10:20-10:40 Gross Motor Activities
10:40-11:00 Formal Motor Lessons (fine motor activities)
11:00-11:10 Sharing Time (ancillary language)
11:10-11:30 Directed Play (purposeful participation and leading on part of teachers)
11:30-11:45 Music (ancillary language)
11:45-12:00 Clean up (getting ready for lunch)
12:00-1:00 Lunch (wind-up of the day's activities)
(Hodges, McCandless, Spicker, 1967)

D. Curriculum and Teacher Training

The curriculum was designed to accomplish the two primary goals of promoting personal-social adjustment to group learning experiences and cognitive development within a formal teaching-learning structure. When the first goal was approximated, the second was attempted since it was felt that social balance was a prerequisite to cognitive achievement.

Teachers were trained to be child-oriented, not content-oriented; to utilize each teachable moment; to demonstrate and not just verbally explain concepts to the children; and to develop concrete reinforcements for individual children.

To assist teachers in focussing attention on the child rather than the content, the following procedure was used by the curriculum committee when designing a lesson: review the developmental sequence of the skill to be taught; identify the performance level of each child; then structure the appropriate learning experiences.

The techniques employed by the committee when training the teachers included verbal explanations, directed observations of the children, and role playing by the teacher with certain members of the curriculum committee.

For example, appropriate use of concrete rewards for specific responses of the children had to be perceptively used and required ingenuity on the part of the teacher. The process was demonstrated by a staff member, role-played by the teacher, and then used in the classroom. Staff observations were made to insure that the rewards were being properly administered.

Two strategies were used to improve the teacher's diagnostic evaluation of the children's performance. One approach was the use of a chart containing the children's names, the major curriculum goals, and a check-list containing an evaluative scale describing the degree of deficiency in each area of behavior. These charts were checked once a week with the curriculum committee. These observation charts are shown in Table 3. Another approach was including on every typed lesson plan a space for recording individual and group responses to that particular lesson. (See Table 4.)

To summarize, through the interaction of the curriculum committee with the teacher, it was possible to implement the diagnostic curricula with varying degrees of success. The weekly sessions included diagnostic study, formulating specific lesson plans, and evaluation of progress. The techniques of role-playing and demonstration proved to be valuable approaches in improving the teacher's effectiveness (Hodges, McCandless, Spicker, 1967).

Table 3

WEEKLY DIAGNOSTIC RATING SCALE
DIAGNOSTICALLY BASED CURRICULUM PROJECT

Cultural Deprivation Project-Rating Scale for Children to be used in conjunction with the weekly lesson plans.

Rating	Category Description
1	No specific work needed in this area - the child is as competent as can be expected.
2	Some attention required; work in this area is not crucial for this child; exercises on relevant tasks should be given when time permits.
3	Considerable attention required; exercises on relevant tasks should be given as often as possible.
4	Major deficiency; daily attention to this area.
5	Child not ready for work in this area; exercises would be inappropriate for child at this time.

Name of Child	Perception	Manipu-lation	Social-ization	Language	Cognition	Motivation

[Source: Appendix A, p. 153, Hodges, McCandless, Spicker (1967)]

Table 4

LESSON PLAN RATING FORM
DIAGNOSTICALLY BASED CURRICULUM PROJECT

Rating

1. Interest of children in activity.

Poor		Good		Excellent
1	2	3	4	5

2. Stimulation of children's language.

Poor		Good		Excellent
1	2	3	4	5

3. Stimulation of children's thinking.

Poor		Good		Excellent
1	2	3	4	5

4. Difficulty level of activity.

Very Easy		Adequate		Very Hard
1	2	3	4	5

[Source: Appendix B, p. 154, Hodges, McCandless, Spicker (1967)]

E. Social and Emotional Development

For each year of the investigation, a 6-week period at the beginning of the school year - the socialization phase - was set aside

for the children to learn to accommodate to and cope with their teachers, testers, observers, and themselves. Overt affection manifestations were gradually introduced. Male assistant teachers were employed for the second- and third-year studies in order to alleviate the disruptive atmosphere which was formerly brought on by the novelty of male figures when they appeared for testing or observing.

F. Language Development

The project staff, assuming that concept formation and reading readiness could not occur efficiently without adequate oral language, chose as one of its major cognitive goals the development of richer and more effective language.

Two basic developmental strategies were employed throughout the investigation: a daily formal language period consisting of structured diagnostic language lessons; and a series of ancillary language activities designed to reinforce the lesson objectives and provide opportunities for transfer of language skills. These two strategies will be described more fully in the Specific Methodology of this report.

G. Motor Development

The rationale for including structured motor development in the curriculum was that fine motor coordination is essential to writing activities; and gross motor skills are necessary for socialization activities. The daily formal motor development lesson was taught by a physical education graduate student. Series of ancillary motor activities designed to reinforce the motor lessons were also incorporated into the daily program. The formal motor lessons emphasized fine motor development; in addition, a daily physical education period gave the EPS students opportunity for gross motor development.

Methodology: Specific Examples

The following represent descriptions of specific activities which better illustrate how the curriculum was implemented (Hodges, McCandless, Spicker, 1967).

A. Social Development

Firmly, politely, and consistently during the first part of each school year, the children were taught such things as: to take turns, to call their teacher and her aide by

their names rather than "Teacher," to brush their teeth after meals, to clean themselves and wash their hands after toileting; to answer questions in complete sentences; to use "Please" and "Thank you." Discipline for both the EOS and KC groups was mild reprimand or "Time out." Physical discipline, other than gentle restraint for an occasional out-of-control child, was never used.

More for the EPS than the KC groups, tangible rewards were used copiously during the early part of the school year. These were always accompanied by verbal rewards such as approbation, praise, expressions of appreciation, and, when the children came to the point where they welcomed physical contact, physical gestures of reassurance and affection. This was a loose application of "behavior shaping" and "conditioning to secondary reinforcement" theory and practice. The demand for tangible rewards diminished to almost nothing by the end of the intervention year.

The investigators and others associated with the study made regular observations of the EPS groups. In this sense, the development curriculum was more diagnostically based for the EPS than for the KC groups.

Training was given in such behaviors as listening, planning, concentration, delay of gratification, and working for the satisfaction of working. Appropriate patterns of reinforcement for such behaviors were worked out for each child, for special subgroups, and for the total group. The following illustration demonstrates group training for listening, concentration, and delay of gratification: Initial "impositions" of silence were literally momentary. To develop group-attention behavior, the teacher would say, "Let us see if you can all be quiet for one second." A tangible reward (sometimes candy but more often one of the niblet cereal products available on the market) was then dispensed to all children in the group who had achieved the goal. The silence time was slowly but consistently made longer and, within a few weeks, the children were generally quiet and receptive when the teacher judged it necessary for purposes of instruction.

B. Self-Concept Development

Colored photographs of all children were taken early in the school year and attractively mounted. The teacher

then made sure that each child could identify not only himself, but every other child in the group. The ability to match a picture with a given child would then be followed with learning the first name of each person in the room. A sizable proportion of the children did not recognize their own pictures. They often showed a mixture of delight and dismay with their pictured image.

A full length mirror was introduced and maintained throughout the school year to help the children develop their own body concepts and to assist them with grooming. A mirror was also introduced as a part of a "dressing table," at which the children brushed teeth and hair, or manipulated collars and other external aspects of their dress.

"Guess Who" was a frequent game: "I am thinking of a girl with brown hair and blue eyes who is wearing a pink dress." As a general rule, the children were far more accurate in recognizing others during this game than they were in self-recognition, although after a few weeks of the game all children mastered self- as well as other-references.

Further formal instruction in this area consisted in drawing silhouettes of themselves and others, recognition of these silhouettes, and recognition of silhouettes with parts missing. Considerable experience with small figure drawing was also given. A "Muscle Club" was developed for the boys, which served the combined functions of "brotherhood," recreation, prestige, outlet for energy, development of gross and certain fine motor skills, experience in following rules, and self-inhibiting behavior. At first restricted to boys, it was later found that this Club appealed as well to some of the girls, who were welcomed into its ranks. It also served as a valuable ancillary language activity.

A general strategy used throughout the EPS classes was that of regular reviews with each child of concrete examples of his work. During these reviews the objective was to help the child see the kinds of improvement he had made and to reinforce his efforts directed towards the achievement of more sophisticated techniques and products.

C. Formal Language Development Program

1. Diagnosis

By the time their kindergarten experiences had begun, a majority of the children had learned a restricted language code by means of which they were able to communicate their needs and understand simple verbal instructions. However, they were, in general, unable to cope with elaborative language. For example, they were typically able to give the generic label "chair," to a rocking chair, easy chair, or straight backed chair; but could not provide the differentiating labels, "rocking," "easy," or "straight-backed." In addition, they could not compare or contrast such chairs with respect to size, shape, color, texture, or multiple function. This elaborative language deficit was further demonstrated by their performance on the Binet. The project children did least well on those items which involved somewhat prolonged speech sequences, and best on those items in which the verbal stem and response were short.

A related problem was discovered by an item analysis of the initial Peabody Picture Vocabulary Test (PPVT) protocols of the total study sample. A rank order correlation of .71 between the order of difficulty for the entire study sample of 5-year olds and the placement of these items in the test was obtained. Gerunds such as yawning, tying, picking, building, pouring, sewing, catching, were much more difficult for the project children than for the standarization sample. Labels for uncommon objects or things seldom encountered in their familiar environments, such as dial, caboose, peacock, and eagle were also more difficult for the project children.

Because it was assumed that elaborative, representational language is necessary for the development of symbolic thought, verbal mediation, and later school success, the language lessons and ancillary language activities were designed to elicit elaborative language and to reinforce its use whenever possible.

2. Remediation

Language lesson development evolved gradually over the 3-year period as the project staff continuously utilized the feedback from

both test results and classroom observations. For this reason the formal language lesson is perhaps the component which varied most from year to year in its implementation. Since achievement test results for each study indicate that all the experimental language approaches produced significant gains in favor of the EPS group, this report will attempt to describe each study's approach and the rationale behind it.

The objectives for language development in each study remained the same; only the vehicle for realizing them changed.

These goals were as follows:

1. Develop each child's elaborative language.

2. Build upon each child's level of language skill as diagnosed by the Illinois Test of Psycho-linguistic Abilities (ITPA)

3. Program the lessons for complexity according to the development shown by the children as judged by the teachers.

Study I:

During the first month of Study I the children were pretested using the ITPA. The results from these tests were then used by a language consultant to diagnose the children's learning deficits and ultimately to design 68 language lessons for the EPS classroom teacher. For this reason, structured lessons were not available until the second semester; however, the ancillary language activities described later were employed by the EPS teacher.

Inspection of the individual profiles obtained from the ITPA results and observations of classroom behavior provided a logical basis for dividing the children into two groups of approximately eight children each for formal instruction. The first group was characterized as "high-vocal" (i.e., they monopolized the conversation during group work); the second group was characterized as "low-vocal" (i.e., they were passive participants in group work).

The low-vocal group received an instructional core that stressed expressive (encoding) aspects of psycho-linguistic skills. The high-vocal group received lessons requiring association and attention-concentration skills. An attempt was made to individualize the instruction by providing specific directions for each pupil within the lesson.

Three methods for developing elaborative language were incorporated in the language lessons: response elaboration, verbal definition, and verbal feedback. Two methods were used to stimulate response elaboration. The first involved the labeling activities present in many of the lessons that focussed on expressive language. The method included three steps. In Step 1, the children labeled or named the object. At this level, a child was required only to provide the name. Step 2 required him to improve the quality of his response by identifying the salient features of the object that he was labeling. In Step 3, he discriminated vocally between similar objects on the basis of structural or functional characteristics, and categorized apparently dissimilar objects according to some common feature.

The second method for developing response elaboration dealt with the length and completeness of verbal responses. Through feedback, direct questions, and supplying a model response, the teacher attempted to build from one-word responses and sentence fragments, to complete sentences. This procedure was also followed for tasks that required a visual-motor response to complete a picture story (Hodges, McCandless, Spicker, 1967).

Verbal definition was incorporated in all lessons to insure that the child understood the meaning of what he was witnessing and its relationship to other things.

Two forms of verbal feedback were used. The first was to give a modified feedback of the child's response. Second, corrective feedback as employed here provided the children with a model of an appropriate response; but at the same time avoided a negative statement in identifying the incorrect response. For example, if a child labeled a cow as a "Moo moo," the teacher responded, "Yes, that is a cow, and cows say Moo, moo" (Hodges, McCandles, Spicker, 1967).

Study II:

The Study II language program differed in certain major ways from that of Study I: 1) A reservoir of formal and informal experiences with children of this socio-cultural-intellectual level had accumulated. 2) The investigators

believed the previous year's lessons had been too fragmentary in that they lacked continuity from one lesson to another or from formal lessons to ancillary activities occurring during the remainder of a school day. (In Study II, continuity was better attained by embodying the lessons in units that related to other on-going class activities.) 3) In all probability, the language lessons of Study I may not have been sufficiently based on the children's previous experiences. (In Study II, the authors tried to introduce the new by using and consolidating the old and familiar.)

Otherwise, the basic principles were much the same as described for Study I. Experimental children in Study II were given almost twice as many formal language lessons as the Study I children. These lessons began as soon as the socialization period was complete (about 6 weeks after the children entered school).

The beginning of each lesson was used to check what was known by the children and to consolidate previous gains made by them. Old words and concepts were related to new ones, which were added in a context made partially familiar by including in it a majority of familiar words and concepts. Time orientation was also provided by review and transition activities. Discriminations and generalizations were interwoven with games and familiar objects. The teacher and assistant teacher (aide) served as models and reinforcers.

The following description illustrates how the general principles were applied in Study II as well as some of the problems.

Following a 4-day unit on farm animals, a transition from that unit to a living room unit was made in the following manner. The lesson began with a review of the earlier description of a dog. Next, pictures of a house and barn were shown and the children were asked to identify them and to decide which one the dog would like to live in. They were then asked <u>why</u> the dog would like to live there. Next, they pretended that they were visiting in a house, discussing how they would go about finding whether there was anyone at home. When they knocked on the door, the teacher invited them in and they sat down in the living room. At this time, the high group discussed the furniture found in a living room.

It required 2 days to complete the next lesson. On the first day, entering the house and going into the living room were reviewed. "Living room" was a new concept for all the children, and the closest they could come to the concept was "front room." During the rest of this language session, various pieces of furniture were named and described. The description the first day was so complete that the group did not get around to all the common types of living room furniture, so the topic was continued into the second day. The high group remembered the word "cushion" from the previous day, but the teacher had again to supply the term "lamp-shade." After the first description, the objects were again presented, and function was asked for as well as description. Neither the high nor the low group had difficulty with the function of the pieces of furniture.

The next lesson dealt principally with the mock TV and the story of the Gingerbread Boy. This lesson began with a review of names and descriptions of the various pieces of furniture. The TV was the last item named, and the teacher then held up the mock TV. The low group did not recognize it as a TV until it was "turned on," but the high group recognized it at once. After the TV was "turned on," the teacher placed the first picture of the story in the mock TV and sat in silence. The children were asked what was missing from the TV; only the children in the high vocal group correctly indicated that it needed sound. The children were told that they would have to supply the sound by telling a story about the pictures shown in the TV. The story need not have been the actual story of the week, but in this instance, it was. They had no trouble with this new way of story-telling, and seemed to enjoy it keenly. It fitted well into the previous farm unit, since a horse and cow were among the characters.

The next lesson attempted to teach similarities and differences among different types of chairs. When the children came into the group for the lesson, there was a different type of chair for each child. The first thing they were asked was to name what they were sitting in. Then they stood up and looked carefully at their own chairs and those of their neighbors. Both groups immediately recognized that the chairs were all different. They were then led into a discussion of how the chairs were alike,

and again all children in both groups knew that the chairs all had four legs, a back, and a seat. Each child was then asked to bring his chair to the front of the group and describe it to the rest of the children. The high group managed this well, and needed to be supplied with only the words "metal" and "wood." The majority of the low group, however, had to be coached with leading questions. Interest was good for both groups for this lesson, although it involved too much movement for the low group and the children became distracted. On the second day of the lesson, the chair game was played. This is a memory game in which the children all face the wall while one of the chairs is placed in the center of the circle. They are to tell both whose chair it is and describe how they were able to tell. Interest was good in the high but poor in the low group, again because of their easy distractibility and the amount of movement involved in the game. In the high group, the children verbalized rather well how they knew the chair belonged to a given child, although they needed help with fine discriminations. The low group typically said the chair belonged to X because it was the chair he was sitting on. The high group finished the game first, and the children were given pictures of chairs to hold and described to the group. They gave good descriptions of the chairs, but interest began to lag near the end of the lesson (Hodges, McCandless, Spicker, 1967).

Language lessons for the rest of the year followed this pattern.

Study III:

Two correlated language development programs were developed in the third year of the project. Response elaboration and verbal feedback continued to be used in presenting individual lessons. It was assumed that a format of language instruction could be developed (based on ITPA scores) that would include the strongest aspects of the curriculum of the preceding years, but at the same time could also be diagnostic in nature.

A series of new lessons was developed using the thematic approach of Study II and incorporating the expressive language and concept formation elements of Study I.

After one semester, the lead teacher suggested that these new lessons were non-directional and included too many objectives within

a single lesson. For example, one series of lessons introduced the names of various fruits so as to increase the labeling vocabulary of the children. However, an attempt was also made to use the lessons to extend the use of descriptive adjectives, categorize the fruits by different classes, and stimulate the use of complete sentence structure when describing the fruits.

The revised language program used during the second semester was a plan of language strategies to be employed for all language occurrences during the day. It was directed at: detecting and correcting language disabilities; introducing the basic structure of expressive language to the learners; making basic language structures habitual for the learners; and, using basic language structures to deal with naturally occurring events.

A series of psycho-linguistically oriented lesson plans were now developed. Their format facilitated identification of specific language deficits; provided flexibility in varying the level of difficulty; permitted correlation with the core of other classroom activities. The auditory discrimination format shown in Table 16 illustrates a psycho-linguistically based lesson.

Procedures for teaching basic structure underlying the English language were introduced during the formal language periods. Stress was placed on teaching polar and non-polar discrimination (e.g., long-short, black-white, up-down) and the production of statements incorporating these discriminations (Hodges, McCandless, Spicker, 1967).

D. Ancillary Language Activities.

Sharing Activities. The objectives of a) stimulating more adequate ability to talk to a group; b) encouraging better attention in group situations; c) developing memory for ideas presented in group situations (all extremely important in improving school readiness), coupled with the observed deficiencies of the children in these areas, led to incorporating a sharing period in the daily program.

To improve each child's ability to talk to a group, the "grab bag" game was played. As objects were pulled from the bag the children took turns describing them. The teacher encouraged elaborative language by asking about the properties of the object.

To develop concentration and memorization skills, the children were encouraged to recall experiences from activities which took place on preceding days.

Table 5

AUDITORY DISCRIMINATION LESSON FORMAT
DIAGNOSTICALLY BASED CURRICULUM PROJECT

(This format should be used prior to the auditory memory format. The materials incorporated are suggested materials. Some of the materials used will be used in the auditory memory format.)

MATERIALS: rhythm instruments which will produce a wide range of sounds for gross and fine auditory discrimination: piano, bell tones, etc.

Basic Task	Alter Difficulty Level	Correlated Activities
1. Select two objects which produce grossly different sounds (i.e., bell and drum). Present them to the class and use the basic identification format for naming the objects. Demonstrate the sounds which they make. Let the group members "try" them out. Discuss the differences in the sounds which the objects make (i.e., channel the discussion to use terms which you have previously taught the group, such as: loud, soft, high, low, same, different.		Take the children for a walk. Have them listen for differences in bird sounds, etc. Music time: Play a familiar song that the children have already learned, but do not tell them the name. Let them guess the song heard. Voice identification game: Have the children guess each other's voices by having different children repeat a phrase such as: "Hello, how are you today?" The children should have their eyes closed.
2. Have children close their eyes and sound the object twice. Ask, "Was it the same sound?" Encourage a unison vocal response. Feed back the response to the children and demonstrate to them while they are watching you. When you have a reliable response on same sounds, then tell the children to	At this level, the number of stimulus objects may be increased rather rapidly. In introducing a stimulus object, be sure the children are able to: a) Label the object	

Table 5
(cont.-)

Basic Task	Alter Difficulty Level	Correlated Activities
listen carefully because you might try to feel them. Then vary the procedure by introducing different sound patterns (i.e., bell, bell; then bell, drum). If the children use the descriptive phrase, "different," feed back the response. However, also encourage the use of "It's not the same." Be sure to use complete sentences in your feedback and remember to supply children with the correct response when they are unable to respond. In feeding back the response, demonstrate the stimulus sounds and have the children observe this.	b) Describe it in some manner. c) Identify the sound when they see you use the object to make the sound (i.e., associate sound with label). The difficulty level may be increased by decreasing the difference between the sounds made. A high-difficulty level would be telling differences in two sounds made on the piano or bell tones.	
3. When the children can respond comfortably with the stimulus sound being made in front of them with their eyes closed, move the stimulus materials behind them and repeat procedure two (2) with the children having their eyes open and the sounds being made behind their backs. The response will be made by each individual		Game: "Doggie, Doggie, Where's Your Bone?" One child, acting as dog, sits on a chair with his back to the rest of the class. A block, or other object, is used as the "bone" and is placed under the "dog's" chair. The teacher points to a child in the room to come and take the bone

Table 5
(cont.-)

Basic Task	Alter Difficulty Level	Correlated Activities
child, but the other children should be alert to check the child's response.		from under the chair. The "dog" tries to decide who took the bone by listening for clues as to where the person walked from in the room, etc. Playground Activities: Listen for various sounds different equipment might make, such as swings, teeter-totter, bouncing of a ball, jumping rope, running, etc.

[Source: Table 12, p. 56, Hodges, McCandless, Spicker (1967)]

A record chart was kept on the blackboard to illustrate how the children were progressing in such abilities as sustaining group interest and improving articulation and voice quality.

Several blank squares were placed beside each child's name. A simple set of rules was established. One square was filled in with colored ink each time a child (a) faced the group when reporting, (b) had something interesting to tell, (c) spoke loudly enough for all to hear, and (d) spoke clearly enough to be understood. This simple technique produced quickly visible improvement in each child's performance.

Story of the Week. A story-time period was included in the program in order to extend the children's acquaintance with children's literature, to improve their ability to listen attentively to a story, and to develop skill in retelling a story in sequential order.

Only one story was used a week.

The activities planned around this story were distributed throughout the week. These activities included the introduction of the story by the teacher, and a variety of follow-up experiences such as showing a film of the story and the children retelling the story in sequential order, first through the use of cut-out pictures and then without the aid of pictures. The teacher would also tell the story incorrectly and ask the children to correct the faulty version. The teacher would read the story, omitting certain words and phrases which the group supplied. The culminating activity for each Story of the Week was a dramatization of the story by the children. The repetition, instead of boring the children, apparently gave them a feeling of confidence through real familiarity with the tales. This modification of a typical kindergarten activity was found to be much more effective than traditional story periods in working with the present population of children (Hodges, McCandless, Spicker, 1967).

Structured Field Trips. The first formal language lessons were developed around a unit on farm animals. Here, ancillary language activities served as an introduction to, rather than a reinforcement for, the formal lesson. A farm trip was planned. This activity was carefully structured in order to provide an optimal learning situation. Two days were spent in preparing for this trip. First, the concept of farm animals was introduced to the children through pictures and plastic models of animals. Attention was called to comparison and contrast of size, shape, color, and so on. Records of sounds made by farm animals were played, and farm stories, songs, and games were introduced. It was then judged that the children were prepared to attend to and understand the things they would see on the farm. The physical arrangements for the trip included a child-adult ratio of four children to one adult. This insured ample opportunity to ask questions and discuss what was seen. The post-trip sessions included films and discussions, and established the setting for the formal language lessons.

Snack and Lunch Time. Snack and lunch time were exploited to extend vocabulary concepts and develop number concepts. On these occasions, either the class teacher or one of the assistants usually sat and ate at the tables with the children. This provided experience in using polite language and engaging

in friendly conversation with an adult. Color recognition and taste discrimination were practiced by varying the color and nature of the juices served (e.g., apple juice, lemonade, grape juice, cherry juice). Size, shape, and number concepts were reinforced by offering a variety of snacks such as cookies, cheese crackers, and dry cereal bits. At times the children counted the number of snacks each child had or discussed their color, size, and shape. Conversation also included identifying all the foods that were served, differentiating liquids from solids, vegetables from meats, and raw or green vegetables from cooked or yellow ones. Though informal, this was consciously planned by the teachers. Lunch was served cafeteria style. As children presented their plates to the teacher, they were taught to say, "May I have some -- (naming the food)." They also indicated whether they wanted a large amount or a small amount (Hodges, McCandless, Spicker, 1967).

Concepts such as color, texture, direction, and position were also developed through activities like art, free play, and physical education. In summary, the teachers availed themselves of every opportunity to increase the number of ancillary language experiences during the day.

E. Motor Development

The Kephart Perceptual Motor Development Scale was used to measure gross motor facility; the Lincoln-Oseretsky Motor Development Scale was used to measure fine motor facility. The fine motor factor included finger speed, arm steadiness, arm and hand precision, and finger and hand dexterity. The gross motor factor included static balance, dynamic precision, gross body coordination, and flexibility.

Based on the findings from Study I, the succeeding 2 years placed greater emphasis on the development of fine motor skills by devoting the formal motor lessons to that end.

Children were divided into two groups of approximately eight students each for daily formal instruction in fine motor skills. Lessons were based both on test results and observations of the children's performance. They included activities such as maze tracing, coloring, cutting, and pasting; placing dowels in peg boards; tracing and copying stencils; manipulating snaps, hooks and eyes, buckles, buttons, and modeling clay. These activities were sequenced by level of difficulty.

A separate daily physical education period gave the EPS subjects opportunity for gross motor development.

Evaluation

Each of Studies I, II, and III was evaluated and analyzed separately. The data from the three populations was then combined, producing larger numbers in the three treatment groups (EPS, KC, AHC), and analyzed again. The pattern of gains made in all areas measured is quite similar for the separate studies. For this reason only the combined test results are reported in this section. The analyses were done by applying a one way analysis of covariance.

A. Measures of Achievement (Hodges, McCandless, Spicker, 1967)

The two cognitive behaviors measured in each study were level of intelligence and language facility. The Stanford-Binet Intelligence Scale and Columbia Mental Maturity Scale were the instruments used to measure gains in IQ; the Illinois Test of Psycho-linguistic Abilities and the Peabody Picture Vocabulary Test were used to measure language development.

Intelligence, (Tables 6 and 7): Analysis of the differences between pairs of adjusted means revealed that the EPS groups' combined mean was significantly greater than either the KC or AHC combined mean and that the KC mean was significantly greater than the AHC mean.

The mean for EPS children on the CMMS was equal to the KC collapsed mean; but, both groups significantly exceeded the AHC group.

Mean IQ for both EPS and KC groups shifted from about the middle of the borderline retardation range to the classification of normal for both Binet and CMMS. The AHC group remained within the borderline retardation range.

These results indicate that the experimental curriculum was more effective in increasing intelligence than was the traditional kindergarten curriculum. The investigator, therefore, concluded that a preschool year was more effective than an analagous year spent in residence at home.

Language, (Tables 8, 9, and 10): On both the ITPA and PPVT tests, the experimental group improved significantly more than the KC, and KC significantly more than AHC.

Table 6

STANFORD-BINET IQ SCORES FOR STUDIES I, II, AND III COMBINED
DIAGNOSTICALLY BASED CURRICULUM PROJECT

Group	N	PRETEST Mean	PRETEST SD	POSTTEST Mean	POSTTEST SD	POSTTEST Adj. Mean	Pre to Posttest Mean Gain
EPS	42	73.57	9.08	90.38	10.99	90.91	16.81
KC	44	75.27	9.43	87.54	11.51	86.90	12.27
AHC	56	74.18	9.96	78.27	8.80	78.38	4.09

[Source: Table 20, p. 74, Hodges, McCandless, Spicker (1967)]

Intervention experiences were even more effective for language than for intelligence development with the former showing both more relative and absolute gain than the gains demonstrated by intelligence. At posttest, EPS (and to a lesser degree, KC) children were performing at about the same level in measured intellectual and language skills, whereas at pretest they had been much more retarded in language.

Results from the follow-up testing administered during the first grade for all Study I and II children indicated that the intervention children, whether EPS or KC, seemed to have stabilized in IQ by the time their preschool year was finished; but, the AHC children, given the new experiences of school, showed gains in IQ of sufficient magnitude to cancel the significant differences which formerly existed between these three groups.

Table 7

CMMS IQ SCORES FOR STUDIES I, II, AND III COMBINED
DIAGNOSTICALLY BASED CURRICULUM PROJECT

Group	N	PRETEST Mean	PRETEST SD	POSTTEST Mean	POSTTEST SD	POSTTEST Adj. Mean	Pre to Posttest Mean Gain
EPS	42	83.98	10.51	94.36	12.73	94.07	10.38
KC	43	83.95	9.82	90.28	14.13	90.01	6.33
AHC	42	82.43	10.96	82.90	11.19	83.47	.47

[Source: Table 21, p. 76, Hodges, McCandless, Spicker (1967)]

In the area of language development, the EPS children exhibited decelerated progress; the KC group maintained progress; and, the AHC group showed accelerated progress.

These results may indicate that a traditional first-grade program, though capable of maintaining IQ gains resulting from preschool experiences, cannot sufficiently challenge these children to capitalize on their previous achievements.

B. Other Evaluation Indices (Hodges, McCandless, Spicker, 1967)

Motor Development, (Table 11): Only development of fine motor skills was measured for indications of change. The results of testing indicated that at the conclusion of the intervention period EPS = KC, and EPS and KC > AHC.

Table 8

LANGUAGE-AGE DATA ON THE ILLINOIS TEST OF PSYCHO-LINGUISTIC ABILITIES FOR STUDIES I AND III COMBINED DIAGNOSTICALLY BASED CURRICULUM PROJECT

Groups	N	PRETEST Mean	POSTTEST Mean	POSTTEST Adj. Mean	Pre to Posttest Mean Gain
EPS	26	46.60	64.73	66.46	18.13
KC	27	51.27	63.74	62.46	12.47
AHC	27	50.52	57.33	56.95	6.81

[Source: Table 28, p. 85, Hodges, McCandless, Spicker (1967)]

Table 9

SUBTEST DATA ON THE ILLINOIS TEST OF PSYCHO-LINGUISTIC ABILITIES FOR STUDIES I AND III COMBINED DIAGNOSTICALLY BASED CURRICULUM PROJECT

Subtest	ADJUSTED POSTTEST MEANS EPS (N=25)	KC (N=26)	AHC (N=23)
Auditory-Vocal Automatic	56.87	56.74	55.53
Visual Decoding Test	75.65	69.88	68.35
Motor Encoding Test	72.91	63.74	60.34
Auditory-Vocal Association	66.29	61.61	59.15
Visual-Motor Sequencing	69.96	66.00	56.15
Vocal Encoding test	70.92	63.25	50.98
Auditory-Vocal Sequencing	57.77	58.88	54.82
Visual-Motor Association	72.30	73.39	61.13
Auditory Decoding	61.85	64.95	56.56

[Source: Table 29, p. 87, Hodges, McCandless, Spicker (1967)]

Table 10

PPVT SCORES FOR STUDIES I, II, AND III COMBINED
DIAGNOSTICALLY BASED CURRICULUM PROJECT

Group	N	PRETEST Mean	PRETEST SD	POSTTEST Mean	POSTTEST SD	POSTTEST Adj. Mean	Pretest-Posttest Mean Gain
EPS	42	64.73		91.33		91.90	26.60
KC	44	68.34		82.97		81.95	14.63
AHC	56	65.16	21.44	75.28	19.89	75.66	10.12

[Source: Table 30, p. 89, Hodges, McCandless, Spicker, (1967)]

Personal-Social Adjustment: The measure used for assessment in this area was an Intensity Task Involvement Scale devised for use in Study III. From these results, it was concluded more tentatively than for previous conclusions, that the EPS curriculum is associated with more gains in intensity of involvement in teacher-directed tasks than is the KC experience.

In addition, sociometric data from the students and comparison surveys from the teachers also indicated improvement in social behavior for the EPS groups during the preschool year.

C. Modifications and Suggestions

Several modifications which occurred over the period from Study I to Study III were: the division of language classes into high- and low-vocal groups; the division of children into two groups for fine

Table 11

LINCOLN-OSERETSKY MOTOR DEVELOPMENT SCALE DATA FOR STUDIES II AND III COMBINED
DIAGNOSTICALLY BASED CURRICULUM PROJECT

		FINE				GROSS				TOTAL			
		PRETEST	POSTTEST			PRETEST	POSTTEST			PRETEST	POSTTEST		
Group	N	Mean	Mean	Adj. Mean	Gain	Mean	Mean	Adj. Mean	Gain	Mean	Mean	Adj. Mean	Gain
EPS	30	11.00	19.60	21.22	8.60	7.10	14.27	14.41	7.17	18.10	33.87	35.79	15.77
KC	31	13.39	19.61	19.57	6.22	8.58	14.42	14.06	5.84	21.97	34.10	33.41	12.13
AHC	28	15.64	14.86	13.17	-0.78	7.25	12.46	12.70	5.21	22.90	27.32	26.03	4.42

[Adapted from Table 33, p. 94, Hodges, McCandless, Spicker (1967)]

32

motor lessons; the concentration of effort on fine rather than total motor development; the designing of a language curriculum which could be more easily adapted to individual children and had face validity for the teacher; the addition of male teacher aides. The rationales for these changes were given in the general and specific methodology.

Recommendations for future programs were: explain to a teacher the rationale upon which the curriculum is based, so that she can translate it into educational practice; refrain from using the packaged language lessons alone, they are not as effective as the combined use of ancillary language activities and structured lessons; experiment with diagnostic instruments prior to your study to ascertain whether they are sensitive enough to detect deficits in specific areas of learning; always consider the child's home environment as a cue to what is effective when attempting to apply motivational devices, rewards and punishments; do not offer to pay parents for permitting their children to be in a special project; the scope of intervention projects should be larger than just innovations in school curriculum such as those in the present study; provide transportation to and from school; provide breakfast; provide a follow through program for grades one to three.

Budget

Costs were in excess of the traditional kindergarten program.

Clinical Psychologist	Part-time
School Psychologist	Part-time
Special Educator	Part-time
Reading Specialist	Part-time
Teacher	Full-time
Aide	Full-time
Coordinator	Full-time
Social Worker	1 day a week after initial contacts
Dental	Welfare
Food	35¢/day/child
Transportation	$300 a month
Testing	
Consulting Fees	
Clothing	$300 a year
Medical	Fee

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